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RADIUM

A MONTHLY JOURNAL DEVOTED TO THE CHEMISTRY, PHYSICS AND THERAPEUTICS OF RADIUM AND RADIO-ACTIVE SUBSTANCES

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USE OF RADIUM IN FIFTY CASES OF UTERINE HEMORRHAGE

From Causes Other Than Carcinoma or Myomas*

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NEW ORLEANS

Radium being comparatively a new agent, it is premature to take the position that it has yet reached its maturity or possibilites. As all innovations do, it is now running the critical gamut. In one camp it is unconditionally condemned, while in the other it is equally acclaimed. Where such contention exists the truth is found in the midway position.

Though radium is yet in its developmental period, and though already we have abandoned some of our earlier fondest hopes, still, in the past five years, there have been deduced certain well established clinical facts.

Menstruation is a complex process influenced by innumerable factors, ranging from undeveloped organs, defective endocrines and new growths down to constitutional dyscrasias. In many instances its derangement is a local expression of a constitutional condition; therefore it is most difficult correctly to divide cases of uterine bleeding, of these types, into segregated pathologic groups. In some instances the true pathology is not understood. For the purpose of presentation, the cases have been divided into three nominal groups.

GROUP I. HEMORRHAGE IN YOUNG WOMEN

In Group I are placed those cases in which there is an excessive

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bleeding, with no marked local discomfort, but a decided constitutional impairment resulting from too great a loss of blood. In many of these cases there is no discernible anatomic wrong. Curetting, organotherapy and constitutional remedies fail; the bleeding continues, and in severe cases something radical must be done. What this "something radical" must be reduces itself to the removal of some of the organs, or to allowing the future welfare of the young woman to be jeopardized. Surely many of us have encountered such cases, and the action to take presents a serious problem.

If radium does not act, as we believe, entirely through altering ovarian function, but rather by altering the endometrium and myometrium, then it seems that this is a most valuable field for its use. The literature contains some encouraging reports, and it appears reasonable, as we improve and refine our technic to expect some substantial help. Certainly it would be most valuable to know that excess bleeding could be controlled and the menstruation not suppressed.

Our experience has not been extensive in this group. In one of five cases there is one in which, by the use of small, graded amounts of radium, the flow was returned to normal. In another case, an effort to check the flow by graded doses failed, and the treatment had to be pushed on to complete cessation; but even this was better than an abdominal operation.

Case 1* (62447)—*History.*—Miss R. B., a schoolgirl, aged 17, began menstruation at the age of 12 years. The flow was very profuse at the first menstruation and has continued so. She was operated on June 5, 1917, and a curettage was performed. Since July 17, 1917, she had had practically a continuous vaginal bleeding. Three applications of radium were given, of 1,500 mg. hours.

Result—Complete suppression of the menses followed.

Case 2 (57958)—*History.*—A woman, aged 28, had a cyst removed from the right ovary when she was 22. Four months ago the menstruation began to be excessive and resulted in a flow lasting twenty-five days. She was curetted twice. Four treatments with radium of 3,859 mg. hours were given.

Result—There was a complete cessation of menses.

Case 3 (55149)—*History.*—A woman, aged 33, for several years had had very irregular menstruation, sometimes lasting twenty-eight days. She was operated on for suspension, with no relief. One treatment with radium of 750 mg. hours was given.

Result.—The menstruation returned to a normal and two day type.

Case 4 (57943)—*History.*—A girl, aged 16, started menstruation at the age of 13 years. It was very scanty and irregular. The uterus was curetted, Sept. 15, 1917, after which the menses stopped for three months, and the patient then bled continuously for two months. A small amount of radium was used from an outside source with no relief. Treatment of 1,275 mg. hours was given.

Result.—Two treatments produced a cessation of the menses.

Case 5 (57783)—*History.*—Mrs. E. J., aged 25, began menstruation at the age of 14 years, and was made very sick from its inception. The bleeding lasted eight weeks, coming in large clots, and the flow was profuse. The menses were never regular. She had had one living child and two miscarriages, the last one a year ago, followed by four months

*Publication of the cases reported in this paper is made possible through the courtesy of the Radium Institute of New Orleans. This institute is composed of eight physicians of New Orleans, of whom the author is one.

of bleeding. She had had numerous operations. For the past year she had menstruated twice a month, each period lasting from six to seven days. For the past two months she had had a continuous uterine bleeding. Four applications of radium were given, the first of 75 mg., with eleven hours' exposure, and the remaining three of 50 mg., with eleven hours' exposure.

Result.—The condition was entirely relieved.

GROUP 2. AGGRAVATED AND INTRACTABLE DYSMENORRHEA

Cases of violent dysmenorrhea which have resisted all treatment, and in which the general health is markedly impaired, are placed in this group. The affection is most frequently seen in the neurotic type who are reluctantly yielding to advancing years and are as yet unmarried. It is commonly observed in teachers, or in those lately beginning to work, their mission in life still unsettled. The patient has about ten comfortable days in a month, the rest being spent in bed or in struggling to keep up during the premenstrual or the postmenstrual storm. In many of these patients there may be found no anatomic wrong, but the distress is there and is gravely altering her life. We have all had these rebellious cases, in which endocrines, stem pessaries, curetting and climatic changes fail, and in which it is imperative that something be done. As a final measure, if the life is to be useful, menstruation must be stopped. We know that radium will cause the cessation, and we know further that the treatment is less painful and upsetting than an ablation operation and, still further, that it does not seem to be followed by as intense nerve disturbances. Twelve such cases are here reported, complete relief being obtained in all, chiefly through suppression; but in one instance the treatment relieved the pain, and normal menstruation continued, just as resulted in Case 3 in the preceding group.

Case 6 (64044)—*History.*—Miss L. S., aged 35, a schoolteacher, began menstruation at the age of 14 years and has always suffered pain, but had gradually grown worse in the past four years. She had been unable to teach in this time during her period. She suffered intense headache and backache, and her general health had been markedly impaired. She scarcely recovered from one month's epoch before another appeared. The organs were normal to palpation. A dilatation and curettage were performed and a stem pessary applied, without relief. She was given three applications of radium of 50 mg. and ten hours' exposure each.

Result.—A complete suppression of menstruation and a marked improvement of general health have followed.

Case 7 (57686)—*History.*—Mrs. P., aged 28, who began menstruation at the age of 15 years, suffered severe pain and stayed in bed two days each month. She had been married two years, but had no children. She was operated on, March 13, 1913, having the left ovary removed and part of the right. Her general health improved after the operation, but at the menstruation period she suffered severe pain all over the abdomen, and was forced to remain in bed, with frequent urination during the period. Five applications of radium were given, three of 50 mg., with ten hours' exposure, and two of 75 mg., with ten hours' exposure.

Result.—Suppression of the menstruation followed.

Case 8 (62803)—*History.*—Mrs. V. B., aged 23, a saleswoman, began a normal menstruation at the age of 13, which gave her no trouble until Feb. 14, 1917, when the flow became profuse and very painful. She

was curetted in April, 1917. The appendix was removed, May 15, 1917. The flow had been practically continuous since the April operation. The patient suffered great pain in the back, and general discomfort, and was anemic. She was given a treatment of 50 mg. of radium, Aug. 26, 1917, for a ten hour period, 50 mg., Sept. 9, 1917, and 25 mg., Sept. 19, 1917.

Result—Complete relief followed.

Case 9 (65262)—*History.*—Mrs. P. D., aged 31, who menstruated at the age of 13 years and thereafter regularly and normally, and who had been married fourteen years, having one child, aged 11 years, was operated on four years ago. An appendectomy was performed and a laceration sutured. For the past few years menstruation had been very scant, but the pain was so severe that it necessitated the use of hypodermic injections of morphin. This condition gradually grew worse. Four applications of radium were given, two of 50 mg. and two of 75 mg., ten hours exposure each.

Result—Complete relief followed.

Case 10 (60654)—*History.*—Mrs. R. H., aged 33, who began menstruation at the age of 15 years, had been married eleven years, having no pregnancies. She had always suffered excrutiating pains at the menstrual period, going to bed three days, and had passed large clots of blood. The flow was very profuse. Five applications of radium were given, each of 50 mg. and ten hours' exposure.

Result.—The menstruation was suppressed and there was complete relief.

Case 11 (57713)—*History.*—Miss H. H., aged 30, began menstruation at the age of 14 years, and it was regular until she was 17, when it became irregular and developed pain. The pain had gradually grown more intense and she had to remain in bed one week. The flow was very profuse, especially in the past six months. Six applications of radium were given, each of 50 mg. and ten hours' exposure.

Result.—Complete relief followed.

Case 12 (53695)—*History.*—Mrs. P. G., aged 25, who had been married four years, suffered with dysmenorrhea before and after marriage until the birth of her child. The appendix was removed, the ovary resected and the uterus suspended shortly after her confinement. She then suffered with pains in both sides, and with a profuse menstruation, lasting seven days and extremely painful. She also had severe cramps in the legs. Two applications of radium were given, 75 mg. total twenty-four mg. hours.

Result.—Complete relief followed.

Case 13 (61710)—*History.*—Miss M. A., T. N., aged 35, menstruated normally until ten months ago, when she began suffering great pain and having a profuse flow. She had had a decided loss of weight in the past ten months. Two applications of radium mere given, one of 50 mg., with ten hours' exposure, and one of 75 mg., with ten hours' exposure.

Result.—Suppression of menstruation followed and great improvement.

Case 14 (68655)—*History.*—Mrs. V. B., aged 38, had a normal menstruation at the age of 13 years, and had been married fifteen years, having one child, aged 11, and one miscarriage, seven years ago. Nine months ago an appendectomy and a myomectomy were performed on her. She had a scant menstruation, and felt dreadfully during the period, suffering general prostration. One application of radium of 50 mg. was given of 525 mg. hours.

Result.—Menstruation stopped for six months and then reappeared as the three day type, with no pain.

Case 15 (55352)—*History.*—Mrs. H., aged 35, who had been married ten years, and concerning whom there is no record of menstrual history, was operated on two years ago for profuse menstruation, but without relief. She suffered intense headaches at the time of the flow, necessitating her remaining in bed. Two applications of radium of 75 mg. were given, with ten hours' exposure.

Result.—Suppression of menstruation and complete relief.

Case 16 (65065)—*History.*—Mrs. E. T., aged 30, had been married eight years and had never suffered from menstrual periods before her marriage. She had been married two years when a child was born, and was healthy for two years after, when pains in the sides and ovaries developed during menstruation. The menstruation began to be irregular and to appear twice a month. The patient was curetted one year ago for continuous bleeding, which was checked temporarily, but again appeared with the former pains. One application of radium of 75 mg. was given, with eighteen hours' exposure, a total of 1,350 mg. hours.

Result.—The flow gradually decreased. There have been no late reports.

Case 17 (66803)—*History.*—Mrs. A. C., aged 32, who had menstruated normally and regularly until two years ago, had been married thirteen years and had had two children, the youngest 10. She had had no miscarriages. For the past two years the periods had been exceedingly painful and associated with nausea and intense headaches. Three applications of radium were given, two of 50 mg. and one of 75 mg., each with ten hours' exposure.

Result—Complete relief followed.

Case 18 (71289)—*History.*—Mrs. M. D., aged 46, who had been married twenty-seven years and had no pregnancies, and whose menstruation was, as a rule, irregular, was operated on five years ago, an appendectomy and the removal of one tube and ovary being performed. After the operation the menses were regular, accompanied by a great deal of pain, requiring her to go to bed for a week. For the past three years she had been menstruating every three weeks; and for the past month the flow was very profuse, lasting from eleven days to two weeks. Four applications of radium of 50 mg. were given, with ten hours' exposure.

Result.—Complete suppression of the menses and complete relief followed.

GROUP 3. CHRONIC METRITIS

In this division falls the greatest number of cases. For want of a better term "chronic metritis" is used. Whether the pathologic condition is polypoid, hypertrophic or hyperplastic endometritis, or results from myopathic or vascular changes, most of these conditions are combined in the term "chronic metritis."

The ages of the patients are usually between 36 and 56 years. Many have had numbers of children; the uterus is in malposition, enlarged and firmer than normal, having associated therewith an enlarged chronic cervicitis. In these cases, bleeding is often rebellious; the patients may be curetted repeatedly, to no avail, and the final cure comes about through hysterectomy. Often the bleeding is so profuse that packing becomes necessary. To treat the condition, inflammatory diseases must be eliminated first; next, an exploratory curettage is performed in search of malignancy. Then, by the application of radium, the menstrual life is

brought to a close. So far as our experience extends, it seems that the nerve upheaval is less through this method than the surgical. It is well known that most of these uteri have about completed the useful period, and when complicated by pathologic changes following a low grade infection, only complete removal gives the desired relief. Radium is unquestionably preferable in that it accomplishes the same result with less discomfort and no danger to life. As will be seen from the histories, thirty-five such cases were treated, with one partial failure. In this case there persisted an occasional bleeding, especially after coitus, and fearing potential malignancy, the uterus was removed.

There is some discomfort associated with radium intra-uterine applications, as seen in malaise, nausea and general lassitude, lasting from twenty-four to thirty-six hours; but this is negligible in most cases, and its worst form is in no way comparable to the operative course. If radium had no other field of virtue than is evidenced in this group, its use is warranted.

Though radium is by no means fully developed, and even if we discount some of the earlier claims for it, there have been produced sufficient positive data to cause it to take rank as a useful agent, and I feel that it should be made available to the localities through co-operating professional groups.

Case 19 (58300)—*History.*—A woman, aged 42, who menstruated at the age of 14 years, and whose flow continued regular and normal, had been married eighteen years. The oldest child was aged 16 and the youngest 11. For the past year menstruation had been very irregular and very profuse, lasting five days. At the last period there was a heavy flow lasting twelve days. Examination revealed a large uterus, freely movable. Two applications of radium were given, one of 75 mg. and the other of 50 mg., both with eleven hours' exposure.

Result.—Complete relief followed.

Case 20 (62969)—*History.*—Mrs. H. S., aged 29, whose menstruation began when she was 16, and who has one child, aged 3, was curetted two years ago and had the uterus suspended and the appendix removed. For a year and a half following she had a profuse flow during menstruation, and for the past two months the flow had been almost hemorrhagic, and accompanied with pain and large clots. She had pain in the back and the ovarian region, and lost weight and became constipated and anemic. Three applications of radium were given, each of 50 mg., with eleven hours' exposure.

Result.—Complete relief followed.

Case 21 (61200)—*History.*—Mrs. L. T., aged 35, began menstruation at the age of 15 years, which was irregular and lasted eight days from the start. She had been married three months. The appendix was removed in September, 1916. Since the operation she had been bleeding twice a month. Menstruation was profuse and lasted from ten days to two weeks. She was very weak from the loss of blood. Two applications of radium of 50 mg. each were given, with eleven hours' exposure.

Result.—Complete suppression of the menses followed.

Case 22 (65485)—*History.*—Mrs. F. Y., aged 36, who had been married ten years and had one child, aged 9 (no miscarriages), had menstruation which was regular, but always painful. About a year ago the flow became more profuse and more painful. She was operated on in June, 1917, an appendectomy, a removal of the left ovary and a resection of the right ovary being performed. Six weeks after the operation she had a severe hemorrhage, necessitating packing. The uterus was large, freely movable and normal in position. The patient was a

marked neurotic and definitely anemic, and was almost a physical wreck from the excessive bleeding. Four applications of radium were given, two of 75 mg. and two of 50 mg. each, with ten hours' exposure.

Result.—A complete suppression of menstruation and a complete transformation constitutionally followed.

Case 23 (64525)—*History.*—Mrs. A. P., aged 40, had been bleeding profusely off and on for the preceding nine years, and an amputation of the cervix and a curettage were performed five years ago. She has seven children, the youngest aged 10. After the operation, the bleeding was more profuse, hemorrhagic at times. There were severe pains in the abdomen during menstruation. Four applications of radium of 50 mg. each were given, with ten hours' exposure.

Result.—Complete relief followed.

Case 24 (73309)—*History.*—Mrs. W. R., aged 31, had had a profuse uterine bleeding for three weeks. She was curetted, Sept. 16, 1918. Relief followed for only two months, and then bleeding recurred. There was a slightly bloody discharge off and on, and the flow was very profuse at the time of her period. Three applications of radium of 50 mg. each were given, with ten hours' exposure.

Result.—Complete relief followed.

Case 25 (56058)—*History.*—The patient, aged 38, began menstruation at the age of 14 years. The flow was regular but profuse. She had two children. For several years she had had frequent bleeding, both at the regular period and between the periods. Curettage relieved her for only two months. The bleeding stopped for ten days; then, September 13, the flow started and continued almost hemorrhagic, until November 9. One application of 75 mg. of radium was given, with twelve hours' exposure, 900 mg. hours.

Result.—There has been an improvement in bleeding, but it has not entirely stopped.

Case 26 (61691)—*History.*—Mrs. A. J., aged 31, was perfectly healthy until four years ago, when her menstruation began to be irregular, very profuse, and to last five days. She was operated on one year ago. A dilatation and curettage and an appendectomy were performed, but no relief was obtained. The patient suffered loss in weight and became anemic. Four applications of radium were given, three of 50 mg. and one of 75 mg. each, with eleven hours' exposure.

Result.—The condition was relieved.

Case 27 (65465)—*History.*—A woman, aged 42, began menstruation at the age of 17 years, which was regular and of five days' duration, and had had five full time children, the youngest of whom is aged 5. The patient was well until May 1, 1917, when she was awakened by a flooding which lasted ten hours. She had not flooded any more until two months ago. During the past two months she had had two hemorrhages, gradually growing worse. During this hemorrhage her temperature was as high as 103.5. Feb. 22, 1918, a dilatation and curettage was performed. Seventy-five mg. of radium were introduced at the time of operation, with nineteen hours' exposure, 1,425 mg. hours. March 13, 75 mg. were given, 900 mg. hours. The patient returned to the city a few months ago with a temperature of 102, whereupon a pyometra was discovered containing from 6 to 8 ounces of pus, which was drained.

Result.—The patient continued normal.

Case 28 (73517)—*History.*—Mrs. O. W., aged 39, concerning whom there was nothing of interest in her early menstrual life, was curetted three times for excessive bleeding, the last curettage being performed eleven years ago. She has one full term child, aged 16, and had one

miscarriage eight years ago. Since this time had had excessive bleeding. The flow had continued for five or six months and been very profuse at times. Three applications of radium were given, two of 50 mg. and 1 of 75 mg.

Result.—Complete cessation of the menses followed.

Case 29 (56976)—*History.*—Mrs. M. C., aged 36, had had menorrhagia for the past four years. Three months ago she had a severe hemorrhage, and there had been an excessive flow for the past two months. One application of radium of 75 mg. was given, with twenty-four hours' exposure; four days later another, with twenty-two hours' exposure, and another with fifteen hours' exposure.

Result.—Complete cessation of the menses has followed.

Case 30 (67828)—*History.*—Mrs. C. O., aged 40, who had had two children, the youngest of whom is aged 16, menstruated regularly until one year ago; she then began having flooding spells lasting from five to six days, and loss in weight. One application of 50 mg. of radium was given, with ten hours' exposure.

Result.—No return of bleeding; she was discharged relieved.

Case 31 (73559)—*History.*—Mrs. S. C., aged 32, who had had four children, of whom the youngest is aged 4, had always had profuse bleeding during menstruation, but in the past four years it had increased in duration and in quantity. The patient was operated on a year ago; a cyst on the ovary was removed and a curettage performed. Since that time the bleeding has been more profuse and alarming, so that packing was the only means of control. She came to her physician to know if the uterus should be removed or if there was any other way that the alarming hemorrhage could be controlled. Three applications of radium were given, two of 75 mg. (one with ten hours' exposure and the other with twenty-four hours' exposure), and one of 50 mg., with ten hours' exposure.

Result.—Suppression of the menses and marked improvement constitutionally followed.

Case 32 (57201)—*History.*—The patient, whose menstruation began when she was 15, and which was always regular until two years ago, had had five children, three of whom are living. Four years before the radium was applied, an amputation of the cervix and a curettage were performed for excessive bleeding and irregular menstruation. At the time of the operation the uterus was large and freely movable, and the amputation was performed with the hope that the uterus would diminish in size. The patient objected to removal of the uterus. Three applications of radium were given, of 100, 75 and 50 mg., with ten hours' exposure each.

Result.—The flow became slight, with spots after coitus. A hysterectomy was performed, but no malignancy found.

Case 33 (56497)—*History.*—Mrs. P., aged 46, was in good health until six years ago, when she began to suffer with painful menstruation. Three years ago she began having an irregular flow, showing every three weeks and rather profuse. She was operated on one and one-half years ago for the removal of a polypus on the cervix. She also took roentgenray treatments. The flow reappeared six months later, hemorrhagic in character. One application of 75 mg. of radium was given, with ten hours' exposure.

Result—Painful menstruation was entirely stopped and there has been no vaginal discharge.

Case 34 (62617)—*History.*—Mrs. A. D., of whose case there is an incomplete history, was curetted unsuccessfully for excessive menstrua-

tion and profuse vaginal discharge. She was given an application of 25 mg. of radium, with twelve hours' exposure, with two large exposures.

Result.—Complete cessation of the menses followed.

Case 35 (60940)—*History.*—Mrs. E. D., aged 41, whose menstruation began when she was aged 14, and was of the regular normal type, had been married nineteen years and had had two children, the oldest of whom was aged 16 and the youngest 11. She had had almost continuous uterine bleeding for the past year, very profuse at times and passing large clots. Amputation of the cervix was performed, June 30, 1917. Two applications of 50 mg. of radium, each with ten hours' exposure, were given.

Result.—Complete relief followed.

Case 36 (65653)—*History.*—A woman, aged 42, who had been married twenty-one years, and has one child, aged 17, had been operated on six times for the repair of laceration and the removal of one ovary and tube. She had had fairly good health, only painful menstruation. Three months ago the menstruation began being irregular, appearing every fifteen days and lasting nine days. For the last six weeks she had been bleeding practically continuously, passing large clots. Three applications of 50 mg. of radium were given, each with ten hours' exposure.

Result.—Cessation of menses and complete relief followed.

Case 37 (68847)—*History.*—Miss H. K., aged 40, the history of whose case is incomplete, had profuse vaginal bleeding. There had been previous local treatment without result. Three applications of 50 mg. of radium were given, each with ten hours' exposure.

Result.—Complete cessation of the menses followed.

Case 38 (63434)—*History.*—Mrs. M. L., aged 51, who had had ten children, of whom the youngest is aged 8, was curetted eight years ago for bleeding almost continuously, with a profuse flow. The menstruation was regular until twelve years ago, and since that time the patient had been bleeding in between the periods, the flow lasting from four to five days. Preceding the radium treatment, the bleeding was profuse and hemorrhagic in character. The vagina had to be packed to stop the flow. Two applications of radium were given, one of 50 mg., with eleven and one-half hours' exposure, and one of 75 mg., with eleven hours' exposure.

Result.—Complete cessation of the menses followed.

Case 39 (69957)—*History.*—Mrs. E. A., aged 50, who had had six children, of whom the youngest is aged 14, had had no menstrual disturbance until four months ago, and since that time had been bleeding almost continuously with a profuse flow, at times hemorrhagic in character. She was quite anemic, and felt weak from the loss of blood. Two applications of radium were given, one of 75 mg., and one of 50 mg., each with ten hours' exposure.

Result.—Complete cessation of the menses followed.

Case 40 (71949)—*History.*—Mrs. C. P., aged 53, who went through the menopause four years ago, a year later, from excitement and nervousness, had bleeding start again. There had been a slight flow, lasting one or two days, for the last year. Malignancy was eliminated. Two applications of 50 mg. of radium were given, each with ten hours' exposure.

Result.—There was no evidence of bleeding.

Case 41 (54998)—*History.*—A schoolteacher, aged 42, who began menstruation at the age of 14 years and was anemic, had no abnormal

features of the flow until six years ago, when she developed an irregularity and menorrhagia. The condition had gradually grown worse, and she had been bleeding for the last ninety-five days. The uterus was slightly enlarged, the adnexae negative. Two applications of 50 mg. of radium were given, each for twelve hours, and two of 75 mg. for eleven hours.

Result.—Complete cessation of the menses, with a marked improvement of general health followed.

Case 42 (53650)—*History.*—Mrs. M. L., aged 40, a healthy, normal person, had no menstrual disturbance until one year before the radium treatment, when the flow began to increase in duration and quantity, and a flooding spell occurred in May, 1916. When the patient was examined, June 1, 1916, she had a profuse, bloody, vaginal discharge. The uterus was about the size of a double fist, symmetrical and freely movable. There was no adnexa trouble. Fifty mg. of radium were applied, June 5, with eleven and one-half hours' exposure, and 75 mg., June 20, with eleven hours' exposure.

Result.—The uterus is now normal, and a complete cessation of the menses has followed.

Case 43 (65626)—*History.*—Mrs. M. G., aged 40, who had been married twenty years and had three children, was operated on for complete laceration. For the past year the menstruation had been irregular and profuse in quantity, and there had been continuous bleeding for the past eight months. The patient was anemic and very nervous, and had lost in weight. Three applications of radium were given, one of 75 mg. for eleven, and two of 50 mg. for ten and one-half hours.

Result.—There has been a suppression of the menses. Marked menopause symptoms were treated with hypodermic injections of corpus luteum.

Case 44 (65596)—*History.*—Mrs. K. K., aged 42, who had been married seventeen years, and had had four children, all living, the youngest of whom is aged 8, had been curetted twice, the last time two years ago. The flow temporarily improved after curettage, but reappeared, quite profuse. For the past few months, the patient had been bleeding continuously, passing large clots. Three applications of radium, each of 50 gm., with eleven hours' exposure, were given.

Result.—The condition was completely relieved.

Case 45 (70021)—*History.*—Mrs. B. L., the history of whose case is incomplete, began to have irregular menstruation ten years ago. For the past three or four months she had had flooding spells. She was curetted two years ago and operated on twice since then, but the flow continued. Two applications of radium were given, each of 50 mg., and ten hours' exposure.

Result.—The condition was completely relieved.

Case 46 (61565)—*History.*—Mrs. J. M., aged 39, who had had her last child four years ago, was well until two years ago, when she began bleeding excessively. Curettage gave temporary relief. For the past month she had had a continuous flow. She had lost in weight and was anemic. Six applications of radium were given: Aug. 8, 1917, 50 mg., twelve hours' exposure; Aug. 15, 75 mg., twelve hours' exposure; Sept. 3, 25 mg., eleven hours' exposure; Nov. 27, 50 mg., eleven hours' exposure; Jan. 1, 1918, 50 mg., ten hours' exposure, and June 6, 50 mg., ten hours' exposure.

Result.—Complete relief followed.

Case 47 (53807)—*History.*—Mrs. B. V. M., aged 38, of whose case there is an incomplete history, had a miscarriage four years ago. One month later excessive bleeding started, lasting four days. Every month she bled excessively, suffering with pains in the right side, the back and lower extremities. Three applications of radium were given, two of 50 mg. and one of 75 mg., each with eleven hours' exposure.

Result.—The excessive flow was controlled and the patient now menstruates normally, the menstruation lasting six days.

Case 48 (58277)—*History.*—A woman, aged 30, suffered from profuse and prolonged menstruation. An appendectomy was performed and a cystic ovary and small polypus removed, Dec. 16, 1916. A practically continuous hemorrhage had persisted since the operation. Four treatments with radium, totaling 2,550 mg. hours, were given.

Result.—Suppression of the menses followed.

Case 49 (56051)—*History.*—The patient, aged 45, had always had profuse menstruation, lasting for five or six days. The last few years she had menstruated twice in a month. The flow was copious. The patient had been treated locally for a long period. Two treatments with radium, totaling 2,675 mg. hours, were given.

Result.—The condition was completely relieved.

Case 50 (56753)—*History.*—A woman, aged 35 years, had had flooding spells for several years, lasting five or six days. Blood appeared in large clots, and just previous to the radium treatment there was almost a continuous bloody discharge. The patient had been curetted twice, and her appendix had been removed. She had had two courses of deep, roentgenray therapy, which checked the flow for a year, but it reappeared in hemorrhage form. One treatment with radium, of 550 mg. hours, was given.

Result.—Complete stoppage of menstruation followed.

Case 51 (55804)—*History.*—A woman, aged 44, had been menstruating irregularly for the past year and a half. The flow was very profuse and returned every nineteen days, accompanied by pains in the back. One treatment with radium, of 865 mg. hours, was given.

Result.—Complete relief followed.

ABSTRACT OF DISCUSSION

OF PAPERS OF DRS. S. M. D. CLARK AND JOHN G. CLARK

Dr. Harold Bailey, New York: In the radium treatment of cervical cancer there are two problems: The application of the radium to the cervix in such an amount that there will be a retrogression of the local lesion without the production of deep slough or fistula, and the radiation of the parametrium by such massive dosage that the necessary amount of ray intensity (whatever that may be) will reach all parts of the pelvic tissue involved. The first problem is comparatively simple from the point of physical conditions, for the cervical canal is approximately in the center of the involved part and offers an ideal location for an applicator in the shape of a capsule. This type of application will probably always be the chief or most important single factor in the treatment. Granting that a complete retrogression is produced in the cervix, then we are in the same position as if the cervix and uterus had been removed by a simple hysterectomy and the return of the disease is just as certain as if this operation had been done. With small amounts of radium the only way so far as I know, of producing distant effects in the parametrium, excluding rectal application, is by reapplication of the capsule to the same areas in the cervical canal. Experience through

nearly two years of use of radium in this manner has convinced me that it is seldom effective and furthermore that it produces lesions which are quite important as regards the patient's comfort. The second problem is best solved by two types of accessory applications that require large amounts of radium, amounts in the magnitude of a gram. Properly protected these large doses may be placed for short periods in the posterior fornix at either side of the cervix and thus radiate the lower part of the broad ligament. Amounts of 1 gm. may be placed above the surface of the skin and over different areas in turn and thus conduct an additional radium intensity into the pelvic tissues. In this manner it is highly probable that sufficient radium intensity can be produced throughout the pelvis to affect unfavorably any cancer cells that may happen to be there. Unfortunately just the amount that will accomplish our purpose without producing an endarteritis that will some months in the future cause a sclerosis with stricture and fistula and other serious symptoms, must be arrived at by cautious experiment. Therefore, it is quite patent that the possessor of small amounts of radium must be satisfied at present to conduct palliative treatment of inoperable cancer and should not attempt to treat operable cancer. The preoperative treatment of cervical cancer with radium should consist (where only small amounts are available) in using the intracervical capsule for a considerable dose and then waiting three or four weeks before operating. Caution must be used in considering too favorably the temporary hearing of the local lesion for the common history of these cases is that within the period of a year further cancerous development ensues. In cancer of the body of the uterus operation should be done following radiation. Under radium treatment small fibroids may retrogress so that their size causes no symptoms. Larger fibroids may diminish in size but there remains above the true pelvis a heavy sclerotic mass that is apt to cause symptoms from its weight alone. The bleeding in most of the cases may be checked entirely. Cessation of menstruation is probably caused by the lack of functional activity of the ovary and the endarteritis produced in the tumor itself. In selecting the cases it is necessary to rule out not only all those with abnormal conditions in the pelvis but also all very large or the pedunculated or adherent or submucous fibroids and also all those with large retrocervical nodules. There remain suitable for the radium treatment all those that have some physical condition rendering operation inadvisable and also all small freely movable fibroids without any discernible complications. This last mentioned group should have the radium treatment as a tentative measure. The mortality from radium treatment of fibromyoma together with that of the undiagnosed and untreated complications may be higher than 1.5 to 2 per cent. Radium is particularly successful in the treatment of this class of cases. As in the fibroid group the bleeding does not cease usually unless the menstruation is stopped. Care must be used in selecting these cases. A thorough curettage should be done and all the scrapings examined. One piece may show adenomatoid membrane and a nearby section may show signs of beginning cancer. Another possibility that deserves consideration in the radium treatment of younger patients is that a partially ripe ovum may be so injured that on impregnation later abnormal development may occur.

Dr. Ernest C. Samuel, New Orleans: We have not attempted to radiate tumors that are large or rapidly growing, impacted in the pelvis, causing pain or pressure symptoms. We have done this only when they

were of small size and in patients beyond 35 years of age. The tumors not causing hemorrhage have been left to the surgeon, except in probably one or two instances. I was glad to hear what Dr. Clark said concerning sarcoma being a bugbear in the matter of radium treatment. We have had some pain following the application of radium, but since we have ceased using morphin preliminarily to radium the nausea has been reduced at least 75 per cent. We have given up entirely the use of gas for the introduction of radium. Of the 125 patients treated three have come to operation. In one case there was no result whatever from very large doses frequently repeated. As Dr. Clark said, after very careful examination there was no evidence of malignancy found in the specimen. I have had three unhappy experiences with a lighting up of infection after radium was used. I cannot agree with Dr. Clark as to the menopause being a bit short. Our observation has been different. It seems to come on a little more slowly and not to produce the symptoms as fast as he has observed. In regard to malignancy, we are not using the very large dosage of which Dr. Bailey speaks. We have absolutely discarded it, using only the smallest dosage, and after three treatments, which I think is a little more than Dr. Clark gives, if there is no appreciable effect on the mass, we stop treatment entirely and tell the patient's family that nothing more can be expected of radium. Dr. Schmitz of Chicago, has demonstrated that implanting the radium tube in the parametrium is of much value. It seems to offer much in the future care of these cases, especially in recurrences out in the parametrium and deep in the pelvis.

Dr. A. H. Curtis, Chicago: Of the patients whom we have treated with radium we have available statistics from 229. Forty-six with uterine cancer have obtained some palliative relief. Of this number there has been very marked amelioration of the symptoms in fourteen. Up to the present we have had no patient in whom we anticipate that a permanent cure has been secured. The hemorrhage ceases, the discharge stops, the cervix almost invariably heals over; there is cessation of pain for several months, but eventually the patient succumbs to the disease. In the protection of the bladder and the rectum we have found that, instead of the use of the customary gauze pack, insertion of a rubber dam is very much more satisfactory. Because of its elasticity it can be inserted without distress; the parts are forced away from the carcinomatous tissue and we have absolutely no trouble from adhesive vaginitis. In cases in which it is desirable to use radium as a preliminary to operation I think it is well either to operate within the first twenty-four hours before inflammatory reaction has occurred, or to wait for two and a half or three weeks in order that an immunity may have been established from the inflammatory reaction following the application of radium. In the noncancerous group of cases, without doubt radium is of great therapeutic value. We are able to effect a cure in almost all cases where radium is indicated. We have found that the routine use of 1,200 mg. in small sized fibroids and with patients in the menopause there is a tendency to hot flushes which disturb an otherwise excellent result. On this account we are inclined to use a smaller dosage and have recently employed 1,000 mg. or less. In severe hemorrhage in women of younger age, the so-called idiopathic hemorrhage, even a smaller dosage will suffice. In all of these nonmalignant cases there is apt to be bleeding for several weeks, sometimes for a couple of months, but almost always a cure is assured if we are patient. Another complication is that of a very profuse watery discharge, persisting oftentimes

for three or four months; but I know of no case in which it has not spontaneously ceased. I am optimistic concerning the use of radium in intractable leukorrhea of cervical origin. The cervix is open to infection from below. As a result there is marked hypertrophy of the cervical tissues, which are permeated with infection by all sorts of organisms. Fifty milligrams of radium are inserted in the cervix as high as the internal os and left for twelve to sixteen hours. Its use is sometimes necessary again after two months. But finally the glands are destroyed and the infection ceases. The ultimate results are extremely gratifying.

Dr. Edward H. Richardson, Baltimore: I am glad to note that the general tone of these papers has been conservative. There is no longer any doubt about the superiority of radium over other methods of treating certain cases of myoma and I believe the specific indications for its use will soon be defined accurately through the splendid work now being carried on in this field by those possessing this agent. In general, I agree with the limitations as outlined by Dr. John G. Clark. There is one group to be kept in mind, however, which he may have mentioned. This is illustrated by a case of a myomatous uterus not larger than a four months pregnancy in which I advised operation. The ovaries could not be palpated prior to laparotomy and when they were exposed, the left one was found to be moderately enlarged from cystic degeneration while one point on its surface there was a papillomatous outgrowth, one and one-half centimeters in diameter, which appeared to be carcinomatous in nature. One must be careful to eliminate such early cases of carcinoma of the ovaries as a complication of myoma before advising radium, because, if I am informed correctly, it has been the uniform experience of radiologists that malignant growths of the ovaries are not amenable to this form of therapy. With reference to the treatment of carcinoma of the cervix and of the body of the uterus by radium, my observations have been limited to a small series of cases, all either hopelessly inoperable or instances of intrapelvic recurrence. Under such circumstances a cure could not reasonably be expected, but in all of them the rate of growth seemed to have been materially retarded and in other respects, too, its superiority as a palliative measure in these hopeless cases was convincingly shown. It is quite possible that further improvement in the technical methods of radiotherapy may yet reward by brilliant achievement the efforts of those now courageously working in this discouraging field. In the meantime they should receive the unstinted co-operation and encouragement of the profession.

Dr. LeRoy Broun, New York: It would be a great mistake to allow the impression to go out from this meeting that we may indiscriminately make use of radium or the roentgen ray in the treatment of fibroid tumors, and I am glad of this opportunity to accentuate the limitations placed on the treatment of fibroid tumors as Dr. Clark of Philadelphia has done. He clearly brings out the point that the essential factor is a positive diagnosis that there are no complications and the other that of hemorrhage. The presence of pain indicates that some intercurrent pathologic condition exists, such as associated disease of the ovaries and tubes with adhesions or changes in the tumor growth. In 1,760 consecutive cases of fibroid tumors in which operation was done, the following changes had taken place in the tumors: In ninety cases there were necrotic changes; in twenty-five cases there was calcareous degeneration and in twenty-five cases there was malignant disease of the fundus—not of the cervix. In other words, in 8 per cent. of the fibroid

tumors conditions existed in which radium should not be used and in which, as a rule, no knowledge of such changes could be diagnosed prior to the operation. There were a number of ovarian complications, 3 per cent. contraindicating the use of radium. These included ovarian cysts, dermoids and malignant disease. In 7 per cent. there was an infectious salpingitis, not salpingitis the result of increased circulation associated with fibroid tumors. This is where the danger arises in the use of radium—in our inability to make a positive diagnosis and to exclude the intercurrent pathologic condition. In a clear case, however, with absence of coincident pathologic conditions, or of degenerative changes in the fibroid tumor growth, radium is unquestionably of the greatest possible assistance. By it we can control hemorrhagic symptoms in uncomplicated fibroids and save the patient from a mutilating operation. I am glad to place this emphasis on the limitations in the use of radium which Dr. Clark has brought out.

Dr. John Osborne Polak, Brooklyn: Diagnosis is the keynote. All have defined the class of cases in which radium should be used, but they have not shown us how to make this diagnosis. Dr. Clark of New Orleans says they have discarded the use of morphin and of anesthesia in the introduction of the radium, but he does not tell us how he makes a definite diagnosis as to the absence of inflammatory adnexal conditions without the use of anesthesia. Of course, histories are almost always reliable, but errors occur in the best regulated hospital. We recently had two cases in which we used radium; a very active reaction resulted. Both tubes and ovaries had been removed for inflammatory conditions. The operating surgeon had left a large metritic uterus which was causing hemorrhage. Both these women were suffering from diabetic trouble and operative intervention was inadvisable. Both patients were cured with radium but the introduction of radium into these uteri caused the most active inflammatory reaction in the parametrium and in the peritoneum. Our own experience with radium has been limited to these cases of enteritis or subinvolution near the menopause with hemorrhage. We have had seventy-six cases treated for hemorrhage with absolute cure of the bleeding in all of the cases. Three patients have had to have repeated exposures. There has been only one case of a young girl in which radium was used for the control of hemorrhage. This case was treated by repeated small applications of radium with a most satisfactory result. I think it is a mistake for us to give the impression that operation for fibroids is to be eliminated. In watching the cases of other men in which large doses of radium have been used for the control of tumors I have been very much interested in seeing that a number of these cases had subsequently to be operated because of pressure changes and lack of diminution in size. The hemorrhage, however, in all cases in which I have seen radium used and in all the cases in which we have used it ourselves, has been absolutely controlled.

Dr. Henry Schmitz, Chicago: We have endeavored to find an explanation of the fact that some myomas disappear following radium application while others do not. In the latter instance the microscopic sections invariably show the presence of numerous atrophic fibroblasts and an abundance of highly differentiated fibrous tissue. In myoma uteri the dosage has been reduced greatly in the last two years in our work and we now deem a single application of 25 to 35 mg. for 20 hours sufficient to bring about amenorrhea. If the patient fails to respond to one such application we may repeat the dose after three or four months, when the desired result will be obtained. Such a careful plan

of treatment prevents the later appearance of profuse leukorrhea of which so many patients complain and which at times seems to be quite persistent, lasting not only three to six months, but sometimes even a year. Concerning the use of radium in carcinoma of the uterus we must always remember that if it did nothing else than give relief it is preferable to the cautery in inoperable cases. In the hemorrhagic myopathies the results of radium therapy have been good, provided the causative factor has been corrected first. It is of special importance to rule out malignancy. Of twenty-three inoperable cases of cancer treated in 1914 three patients are living and well today, having had no recurrence. The demonstrable reduction in the size of the tumor of a kind not to be attributed to the natural processes of evolution of that tumor or its associated lesions is the one essential feature to be observed in speaking of a curative action of any agent. On the other hand, if such a therapeutic measure relieves symptoms such as hemorrhage and discharge and brings about local healing, the agent is only a palliative one. If we consider the results of radium therapy from this point of view we shall avoid many misunderstandings or wrong conclusions.

DR. SAMUEL M. D. CLARK, New Orleans: If the case histories are studied it will be seen that most of the patients had previously been operated on in some fashion. As to the fibromyomas, I was interested to hear of the percentage of adnexal inflammation being so low, not over 30%. In the colored women, among whom myomas are common, adnexal inflammation is found in 85 per cent., leaving only 15 per cent. suitable for radium treatment. It is to be regretted that there was not more discussion on the control of menstrual bleeding in young women without producing suppression. We need more light on this phase of the subject.

DR. JOHN G. CLARK, Philadelphia: So far as my attitude toward radium is concerned, therapeutically it is at most a mere handmaid of surgery. As I have stated in my paper, there are cases of fibroid which should not be treated by radium, thus reducing the total number of cases to which radium is applicable to a smaller proportion than those submitted to surgery. Particular stress should be laid on the necessity for all of these cases to have the best diagnostic advice before the determination to use radium or the roentgen ray is arrived at. Certainly, it is not within the province of the roentgenologists to pass on this phase of the question. Unless this decision is carefully controlled, serious opprobrium will be cast on a very valuable remedy. Dr. Samuels believes that his patients have not suffered as much with acute menopausal symptoms as ours have. Possibly this may be due to the fact that he has used a smaller dosage. At least, this is the only way in which I can explain the apparent difference in our results. So far as the question of leukorrhea is concerned his patients appear to have a slight leukorrhea but like our series, this is never annoying. Seldom are they troubled with this slight discharge for more than six weeks, and in many instances not at all. A very gratifying sequel in several cases of chronic leukorrhea has been a cure by the use of radium. The one point on which special stress should be laid is that radium does not take the place of surgery, except in a limited number of cases. Every surgeon here knows how reluctantly he advises a hysterectomy in a woman in the menopausal years who is suffering with mere myopathic hemorrhage or from a very small fibroid, as the gravity of the operation is greatly out of proportion to the lesion. These are the cases par excellence for the use of radium and they should never be submitted to operation.